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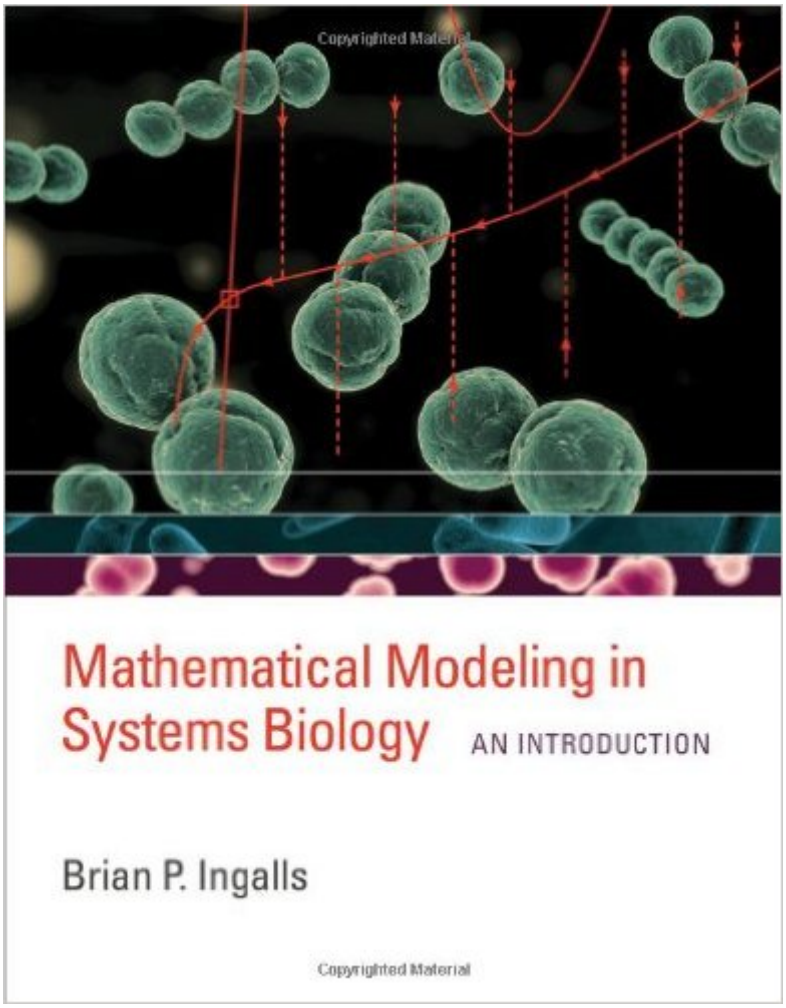
Mathematical Modeling In Systems Biology: An Introduction (MIT Press)



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Synopsis

Systems techniques are integral to current research in molecular cell biology, and system-level investigations are often accompanied by mathematical models. These models serve as working hypotheses: they help us to understand and predict the behavior of complex systems. This book offers an introduction to mathematical concepts and techniques needed for the construction and interpretation of models in molecular systems biology. It is accessible to upper-level undergraduate or graduate students in life science or engineering who have some familiarity with calculus, and will be a useful reference for researchers at all levels.The first four chapters cover the basics of mathematical modeling in molecular systems biology. The last four chapters address specific biological domains, treating modeling of metabolic networks, of signal transduction pathways, of gene regulatory networks, and of electrophysiology and neuronal action potentials. Chapters 3--8 end with optional sections that address more specialized modeling topics. Exercises, solvable with pen-and-paper calculations, appear throughout the text to encourage interaction with the mathematical techniques. More involved end-of-chapter problem sets require computational software. Appendixes provide a review of basic concepts of molecular biology, additional mathematical background material, and tutorials for two computational software packages (XPPAUT and MATLAB) that can be used for model simulation and analysis.

Book Information

Series: MIT Press
Hardcover: 424 pages
Publisher: The MIT Press; 1 edition (July 5, 2013)
Language: English
ISBN-10: 0262018888
ISBN-13: 978-0262018883
Product Dimensions: 7 x 0.7 x 9 inches
Shipping Weight: 1.8 pounds (View shipping rates and policies)
Average Customer Review: 4.7 out of 5 starsÂ Â See all reviewsÂ (3 customer reviews)
Best Sellers Rank: #325,425 in Books (See Top 100 in Books) #30 inÂ Books > Science & Math > Chemistry > Molecular Chemistry #81 inÂ Books > Textbooks > Medicine & Health Sciences > Medicine > Basic Sciences > Microbiology #330 inÂ Books > Medical Books > Basic Sciences > Microbiology

Customer Reviews

it is very good.fast and excellent

Very helpful.

I have read a lot of books on this subject, and this is the one I'd most recommend. I know no other book with such a wealth of important applications, so clearly and elegantly explained. This book brings the reader right up to the level of current research and shows, explicitly, how the calculations are actually done.

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